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Air Vent, Particular for a Motor Vehicle

The invention relates to an air vent, particularly for a motor vehicle, according to the preamble of claim 1.

DE 699 01 356 T2 discloses an air vent for the forced ventilation of spaces, such as passenger compartments in road or rail vehicles, comprising one or more blower units, which can be distributed in the space to be ventilated in accordance with the size thereof. A blower unit here comprises a fan set and blower devices, such as nozzles, the system being characterized in that a ventilator set is connected to each fan set and comprises a central blower device and at least two peripheral blower devices, which are distributed around the central blower device, wherein the blower devices have a tubular housing and a blow guide that is accommodated in the housing and comprise at least three air flow guide ramps, which extend in front of and behind the blower devices, first in a radial plane, and then spirally along a linear part of an approximately central axis of the blower device. The spiral shape results in a wider flow and ensures a wider distribution of the air current. Such an air vent, however, is not suited for the targeted ventilation, such as in conjunction with a multi-zone air conditioner of a motor vehicle.

It is the object of the invention to provide an improved air vent.

This object is achieved by an air vent having the characteristics of claim 1. Advantageous embodiments are the subject matter of the dependent claims.

According to the invention, an air vent is provided with an air-supplying air duct and an air guide apparatus, wherein the air duct in the air guide apparatus is divided into at least two substantially cylindrical partial ducts, and the cylindrical partial ducts run parallel to each other and subsequent to that, an apparatus for adjusting the air flow is disposed.

Preferably a division into four air currents is achieved, wherein at least two partial ducts run parallel to each other. Preferably, at least one of the air ducts is disposed around another partial air duct, particularly concentric thereto. The outer partial duct is preferably provided with a helical-shaped guide, which can be formed by an appropriately disposed wall, so that the outer air current is swirled. The pitch of the helix is preferably reduced toward the outlet port, whereby the flow rate of the air is increased. Preferably two guides are provided in a partial duct.

The metering apparatus is preferably designed such that the air currents of the individual partial ducts can be controlled, in particular independently of each other. The metering apparatus preferably controls both the distribution of the inflowing air to the individual partial ducts and the respective metering thereof. This enables precise metering. The metering apparatus is preferably an adjusting apparatus, which comprises a double flap controlled by way of one or more cam disks. This enables a direct manual adjustment by way of a turning knob by the occupant, whereby a servo motor, a gear ratio or the like is not required.

The invention will be described in more detail hereinafter with reference to an exemplary embodiment with reference to the figures. The figures show:

FIG. 1 a view of an air vent,

FIG. 2 a top view of the central region of the air vent of FIG. 1 having inner contours illustrated,

FIG. 3 a view from a different perspective of the central region of the air vent of FIG. 1,

FIG. 4 a top view of the inner region of the air vent of FIG. 1,

FIG. 5 a view from a different perspective of the inner region of the air vent of FIG. 1 having the illustrated flow path, and

FIG. 6 an illustration corresponding to FIG. 2.

An air vent 1 according to the invention, as it is shown in the figures, connects to an air duct (not shown) and comprises a metering apparatus (not shown). In this context, express reference is made to DE 102 43 974 A1, the disclosure of which is hereby expressly included by reference. The metering device is still disposed in the region of the air duct. The air vent 1 further comprises an air guide apparatus 4, which is disposed downstream of the metering apparatus, and an apparatus 5 for adjusting the direction of the air current disposed in the region of the outlet port 6. In the present invention, this apparatus 5 is formed by a conventional louvered grille having adjustable louvers. The outlet port 6 and thus the apparatus 5 for adjusting the direction of the air current are installed in the instrument panel (not shown) of a motor vehicle. In this way, the occupant can directly adjust the desired direction of the air current.

The air guide apparatus 4 is designed such that at the inlet region thereof the air duct is divided into two substantially equally large partial ducts 11 and 12. The separation is made in the radial direction transversely to the substantially circular cross-section of the air duct. To this end, no directional change with respect to the direction of the air duct is provided for in the initial region, which is also referred to as the inlet region of the air guide apparatus 4.

Subsequent to the inlet region of the air guide apparatus 4, a second division of the two partial ducts 11 and 12 is provided for, wherein in this instance the division is made perpendicular to the previous division. The circular cross-section in the inlet region 10 is bifurcated into two circular cross-section running closely in parallel next to each other, so that a total of four partial ducts 11a, 11b, 12a, and 12b are provided. The partial duct 11a coming from the partial duct 11 has a tubular design. In contrast, the partial duct 12a coming from the partial duct 12 has a hollow cylindrical design and runs outside of the partial duct 11a. The surfaces of the partial ducts 11a, 11b, 12a, and 12b approximately correspond to each other. The partial ducts 11a and 11b are hereinafter also referred to as inner partial ducts, and the partial ducts 12a and 12b are also referred to as outer partial ducts. Two guides 13 having a helical-shaped designed are provided in the partial duct 12a and further divide the partial duct 12a. The pitch of the helical is reduced toward the outlet port 6. The partial ducts 11b and 12b correspond to the partial ducts 11a and 12a, however they are configured axially symmetrical with respect to the plane of the second division (see FIG. 4).

Due to the helical-shaped guides 13, the air flowing through the outer partial ducts 12a, 12b are given a swirl, while the air flowing through the inner partial ducts 11a and 11b runs through straight and exits in a straight manner.

According to the present exemplary embodiment, an adjusting apparatus having a double flap is provided as the metering apparatus, which is disposed parallel to the separation of the duct and which can be controlled by way of two

cam disks connected to each other by a shaft such that each partial duct 11, 12 can be opened and closed individually. The control is carried out by the occupant using an actuating member disposed on the instrument panel (not shown), in the present case a turning knob, which is connected directly to the shaft.

The function of the air vent 1 is as follows: When the position of the double flap is such that the two partial ducts 11 and 12 are opened, an approximately equally large air current reaches the two partial ducts 11 and 12 and also the partial ducts 11a, 11b, 12a, 12b. The air flowing through the inner partial ducts 11a, 11b (indicated by dotted arrows in FIG. 5) flows through the air vent 1 in a direct path and is emitted in a substantially straight direction and with a sufficiently uniform flow profile, when the louvered grille is adjusted in a straight position, into the passenger compartment. The air flowing through the outer partial ducts 12a and 12b (indicated by the solid arrows in FIG. 5) is deflected by the helical-shaped guides 13 and thereby given a swirl, which is still present at the outlet port 6 and provides a certain turbulence of the air and fans out the air currents flowing through the inner partial ducts 11a and 11b.

If the one part of the double flap closes the partial duct 12, and thus the outer partial ducts 12a and 12b, and if the partial duct 11 is open, the air reaches the outlet port 6 exclusively through the inner partial ducts 11a and 11b, so that a substantially swirl-free air flow is emitted to the passenger compartment (spot effect).

However, if the other part of the double flap closes the partial duct 11 and the partial duct 12 is open, the air flows exclusively through the outer partial ducts 12a and 12b of the air guide apparatus 4 and is given the above-described swirl, which is still present at the outlet port 6 and ensures strong turbulence of the air (diffuse setting).

Intermediate regions can be controlled arbitrarily, thereby enabling precise metering of the air current by way of the air vent 1.

List of reference numerals

1 Air vent
4 Air guide apparatus
5 Apparatus
6 Outlet port
10 Inlet region
11 Partial duct
11a, 11b Inner partial duct
12 Partial duct
12a, 12b Outer partial duct
13 Guide

Claims

1. An air vent, particularly for a motor vehicle, comprising an air-supplying air duct and an air guide apparatus (4), the air duct in the air guide apparatus (4) being divided into at least two substantially cylindrical partial ducts (11a, 11b), **characterized in that** the cylindrical partial ducts (11a, 11b) are disposed parallel to each other.

2. The air vent according to claim 1, characterized in that the air guide apparatus (4) provides for a division of the air supplied through the air duct into at least four air currents.

3. An air vent according to any one of the preceding claims, characterized in that at least one further partial duct is provided, which is disposed around at least one of the cylindrical partial ducts (11a, 11b).

4. An air vent according to any one of the preceding claims, characterized in that the air guide apparatus (4) comprises partial ducts (11a and 12a, 11b and 12b) that are disposed concentric to each other.

5. An air vent according to any one of the preceding claims, characterized in that the air guide apparatus (4) comprises at least one helical-shaped or elongated spiral-shaped partial duct (12a, 12b).

6. An air vent according to claims 4 and 5, characterized in that the helical-shaped partial duct (12a, 12b) comprises at least one guide (13), which is disposed in a helical-shaped manner.

7. The air vent according to claim 5 or 6, characterized in that the pitch of the helix is reduced toward the outlet port (10).

8. An air vent according to any one of the preceding claims, characterized in that upstream of the air guide apparatus (4) a metering apparatus is disposed, which is designed such that the air supplied to the individual partial ducts (11, 12) can be controlled.

9. An air vent according to any one of the preceding claims, characterized in that downstream of the air guide apparatus (4) an apparatus (5) for adjusting the direction of the air current is disposed.

10. An air vent according to any one of the preceding claims, characterized in that the ratio of the smallest cross-section of one of the cylindrical partial ducts (11a, 11b) to the smallest cross-section of the associated helical-shaped partial duct (12a, 12b) can be varied from 1:1.5 to 1:0.3.

11. A ventilation system for a motor vehicle, characterized by an air vent (10) according to any one of claims 1 to 10.

Abstract

The invention relates to an air vent (1), particularly for a motor vehicle, comprising an air-supplying air duct and an air guide apparatus (4), wherein the air duct in the air guide apparatus (4) is divided into at least two substantially cylindrical partial ducts (11a, 11b) and the cylindrical partial ducts (11a, 11b) are disposed parallel to each other. In particular further partial ducts (12a, 12b) are provided, which produce a swirl flow. The invention relates to an air vent (1), particularly for a motor vehicle, comprising an air-supplying air duct and an air guide apparatus (4), wherein the air duct in the air guide apparatus (4) is divided into at least two substantially cylindrical partial ducts (11a, 11b) and the cylindrical partial ducts (11a, 11b) are disposed parallel to each other. In particular further partial ducts (12a, 12b) are provided, which produce a swirl flow.

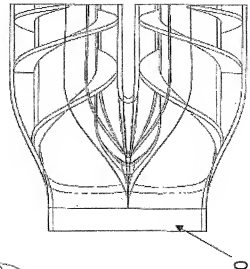

Fig. 2

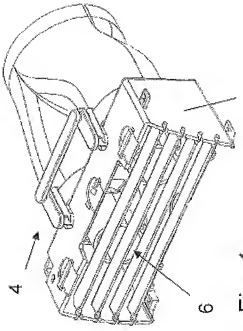

Fig. 1

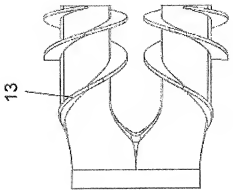

Fig. 4

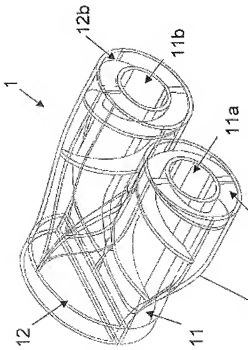

Fig. 3

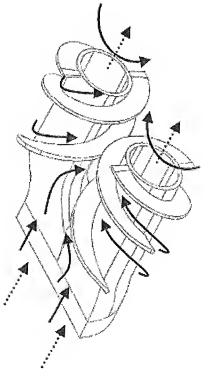

Fig. 5

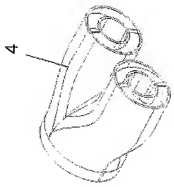

Fig. 6